

## Part-1: Overall EFSM

$Q = \{\text{dormant}, \text{init}, \text{idle}, \text{monitoring}, \text{error\_diagnosis}, \text{safe\_shutdown}\}$

$q_0 : \text{dormant}$

$\Sigma_1 = \{\text{start}, \text{kill}, \text{init\_ok}, \text{init\_crash}, \text{begin\_monitoring}, \text{idle\_crash}, \text{monitor crash}, \text{retry\_init}, \text{idle\_rescue}, \text{moni\_rescue}, \text{shutdown}, \text{sleep}\}$

$\Sigma_2 = \{\text{broadcast\_init\_err\_msg}, \text{broadcast\_idle\_err\_msg}, \text{broadcast\_moni\_err\_msg}\}$

$V = \{\text{allDriversLoaded} : \text{Boolean}, \text{retry} : \mathbb{N} = 3, \text{inlockdown} : \text{Boolean}\}$

$\Lambda = \{$

$\rightarrow \text{dormant}$

$\text{dormant} \xrightarrow{\text{kill}} \text{end}$

$\text{dormant} \xrightarrow{\text{start}} \text{init}$

$\text{init} \xrightarrow{\text{init\_ok} [\text{allDriversLoaded}]} \text{idle}$

$\text{init} \xrightarrow{\text{init\_crash} / \text{broadcast\_init\_err\_msg}} \text{error\_diagnosis}$

$\text{error\_diagnosis} \xrightarrow{\text{retry\_init} [\text{retry} < 3] / \text{retry}++} \text{init}$

$\text{idle} \xrightarrow{\text{begin\_monitoring}} \text{monitoring}$

$\text{idle} \xrightarrow{\text{idle\_crash} / \text{broadcast\_idle\_err\_msg}} \text{error\_diagnosis}$

$\text{error\_diagnosis} \xrightarrow{\text{idle\_rescue}} \text{idle}$

$\text{monitoring} \xrightarrow{\text{monitor\_crash} [\text{inlockdown} == \text{false}] / \text{broadcast\_moni\_err\_msg}} \text{error\_diagnosis}$

$\text{error\_diagnosis} \xrightarrow{\text{moni\_rescue}} \text{monitoring}$

$\text{error\_diagnosis} \xrightarrow{\text{shutdown} [\text{retry} \geq 3]} \text{safe\_shutdown}$

$\text{safe\_shutdown} \xrightarrow{\text{sleep}} \text{dormant}$

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